Mohammad Sadra **Heydari**

MRes student in Economics @ Adam Smith Business School (University of Glasgow)

heydari.msadra@gmail.com heydari-msadra heydari_msadra heydari-msadra.github.io

Education

MRes in Economics Sep 2023 – Present

University of Glasgow — Adam Smith Business School

B.Sc. in Computer Engineering Sep 2018 – Jun 2023

Sharif University of Technology - Department of Computer Engineering *GPA: 17.01/20.0*

Thesis: *Assessing the effect of supervised dimensional reduction algorithms on clustering big socio-economic data*

Minor in Economics Sep 2018 – Jun 2023

Sharif University of Technology — Graduate School of Management and Economics *GPA: 18.9/20.0*

Publications

Absolute Intragenerational Income Mobility in Iran (2023) [Link]

Amanzadeh, N. and ***Heydari, M.S.*** *The Quarterly Review of Economics and Finance.*

Research Experience

Expenditure Mobility and Household Income Dynamics in Iran Supervisor: Dr. Naser Amanzadeh

- Surveyed literature on inter and intra-generational mobility in developing countries.
- Processed raw data from the Household Income and Expenditure Survey (HEIS), encompassing micro-level data from nearly 20k households annually over 40 years, and analyzed Intragenerational Mobility using available panel data for the 2010s.
- Proposed an approximation method employing various Copula distributions, and estimated mobility rates ranging from 40% to 65% for the years 1991 to 2019.

Supervised Dimensional Reduction on Socio-Economic Datasets Supervisor: Dr. M. Amin Fazli

- Employed supervised dimension reduction algorithms (St-SNE) using decile ranking, devised similarity metrics, utilizing demographic, geographic, and financial features to create a synthetic dataset via t-SNE, and compared the performance of clustering algorithms on these datasets.

Honors and Awards

2023	**Economics Scholarship (2+3)**	*Adam Smith Business School; University of Glasgow*	Glasgow, UK
2021	**Best Paper**	*Fourth Iran Economic Forum; Tehran Institute for Advanced Studies (TeIAS)*	Tehran, Iran
2018	**Silver Medal**	*12th International Olympiad on Astronomy & Astrophysics (IOAA)*	Beijing, China
2017	**Gold Medal**	*13th National Astronomy & Astrophysics Olympiad*	Tehran, Iran

Skills

Programming Languages: Python (*advanced*), R (*advanced*), Java (*advanced*), C / C++ (*modest*), SQL (*modest*), Julia (*basic*), MatLab & Octave (*basic*), Stata (*basic*), VHDL / Verilog (*basic*), C# (*basic*), HTML/JS (*basic*)

Tools and Software: MS Excel (*advanced*), Jupyter NB / G Colab (*advanced*), LaTeX (*advanced*), Git / GitHub (*modest*), Dynare (*modest*), Gephi (*modest*), Vensim (*modest*), Twitter & Telegram API (*modest*), CrowdTangle (*basic*), ModelSim (*basic*)

Language: Farsi/Persian (*native*), English (*fluent - IELTS: 8.0*)

Selected Courses

Sharif University of Technology: Econometrics (*19.6/20*), Macroeconomics (*19.9/20*), Game Theory (*20.0/20*), Industrial Organization (*17.3/20*), Advanced Programming (*19.3/20*), Probability & Statistics (*20.0/20*), Linear Algebra (*16.7/20*), Artificial Intelligence (*19.9/20*), Machine Learning (*16.5/20*), Computer Simulation (*19.7/20*)

Adam Smith Business School: Econometrics I (*TBD*), Econometrics II (*TBD*), Macroeconomics (*TBD*), Microeconomics (*TBD*), Mathematical Methods in Economics (*TBD*)

Audited and Online Courses: Using Big Data to Solve Social and Economic Problems (*Harvard*), Natural Language Processing with Deep Learning (*Stanford*), Macroeconomics I, II (*Sharif*), Microeconomics I (*Sharif*)

Work Experience

Junior Data Scientist | *Metodata* Jan 2022 - Sep 2022

Collaborated under the supervision of *Dr. Meysam Alizadeh* and *Dr. Zeynab Samei*.

- Household transaction pattern analysis and anomaly detection
  - Collaborated on a project with the Central Bank of Iran and the Ministry of Welfare.
  - Analyzed 10 million transactions from a 10,000-sample of Iranian households.
  - Utilized Info-map and Leiden community detection algorithms for identifying irregular transaction patterns.
  - Engineered a model achieving 84% accuracy in detecting irregularities based on macro socio-economic features from the Iranian Welfare database.
- Social media analysis
  - Conducted data collection on prominent Iranian social media platforms based on client-specified keywords.
  - Employed LDA-Topic modeling to uncover key themes within the collected data.
  - Utilized a semantic analysis model to gauge public reactions and satisfaction.
  - Applied graph analysis to pinpoint influential users and identify communication clusters.
- Hotel demand prediction for a private booking company
  - Analyzed user activities and reservation data for monthly demand prediction.
  - Constructed a comprehensive dataset, including economic, social, and political factors.
  - Developed a time-series forecasting model for provincial accommodation requests.

Data Engineer Intern | *Institute for Research in Fundamental Sciences (IPM)* Jun 2020 - Sep 2020

Contributed to the R&D team of Iran's National Observatory (INO) project.

- Weather station data pipe-line and data analysis
  - Established a data-cleaning pipeline for the weather report system, handling sensor data reception, filtering, storage, and real-time visualization of station status.
  - Developed a model to detect clouds in night sky images captured by the all-sky camera deployed at the station.

Selected Projects

Regression with Many Predictors | *MRes Econometrics Project* [Link]

- Constructed diverse data-generating processes with multicollinearity and autoregression features.
- Applied Information Theoric Model Averaging (ITMA), PCA regression, and Lasso regression to assess their performance.
- Evaluated bias in coefficient estimation and the ability to eliminate irrelevant covariates.
- Concluded ITMA's superior performance, especially in eliminating irrelevant variables, particularly with low error variance.

Intergenerational Income Mobility for Iran 1984-1990 | *B.Sc. Econometrics Project* [Link]

- Utilized marginal distributions of income per capita from the Iranian Expenditure and Income Survey (HEIS) since 1984.
- Constructed a pseudo-panel incorporating geographical and demographic features of the households.
- Evaluated the percentage of children with higher income than their parents, focusing on those born between 1984 and 1990.

Effect of Class Size on Student's Exam Results | *B.Sc. Econometrics Project* [Link]

- Inspired by the second empirical project from the online course *"Using Big Data to Solve Social and Economic Problems,"* instructed by *Chetty, R.* in 2019 at Harvard University.
- Utilized the regression discontinuity design (RDD) to assess the impact of class size on fifth-grade students' performance in math and literature exams, using the data from Israel's schools in 1992.

Other Experiences

Teaching Assistant Sharif University of Technology Sep 2019 - Jul 2022

- *Probability & Statistics*: Fall 2020, Spring 2021
- *Data Structure & Algorithm*: Spring 2021
- *Introduction to Macroeconomics*: Spring 2021
- *Game Theory*: Fall 2021, Spring 21

References

Dr. Naser Amanzadeh naseramanzadeh.ir amanzadeh@berkeley.edu

Post-doctoral researcher at University of California, Berkeley

Dr. Meysam Alizadeh malizad.github.io alizadeh@ipz.uzh.ch

Post-doctoral researcher at University of Zurich

Dr. Mohammad Hossein Rahmati sharif.edu/~rahmati rahmati@sharif.edu

Associate Professor at Sharif University of Technology